

CLAIMS

We claim:

1. A shaped article of arbitrary shape and size comprising,
an essentially anhydrous biodegradable polymer ("biopolymer") having a WVTR in the
5 range from at least twice to about 50 times greater than that of low density polyethylene
having a melt flow index in the range from 4 – 5 g/10 min;
from more than 5 and up to 35 percent by weight of an essentially anhydrous inert
particulate filler substantially uniformly dispersed in the biopolymer, the filler having a
primary particle size in the range from about 1 μm - 45 μm , wherein at least 75% of the
10 particles are smaller than 25 μm ;
from about 1% to 3% by weight of particulate, essentially anhydrous volatile corrosion
inhibiting (VCI) ingredients substantially uniformly distributed within the polymer, the
ingredient in the article having a primary particle size in the same size range as the
filler;
15 the biopolymer including the filler and the VCI ingredient having a tensile strength of at
least 2000 psi at 23°C in at least one direction.
2. The shaped article of claim 1 wherein the biopolymer is selected from
the group consisting of an aromatic-aliphatic copolyester, an aliphatic polyester having
20 repeating units having from 2 to 5 carbons atoms, and, a polyesteramide formed by
reaction with at least one diacid, at least one diol, and at least one amino acid.
3. The shaped article of claim 2 is film having a thickness in the range from about
0.025 mm (1 mil) to 0.125 mm (5 mils) which film is substantially transparent in a
25 thickness of 0.025 mm and essentially free of agglomerates greater than 50 μm ;
and each unit area of biofilm 0.025 mm thick, containing solid powder particles
dispersed therein, has a variation in population density of the particles which is less
than $\pm 20\%$.
- 30 4. The shaped article of claim 3 wherein the film has a thickness in the range from

about 0.025 mm (1 mil) to 0.125 mm (5 mils), and a variation in population density of the particles which is less than $\pm 10\%$ from one unit area of the film to another.

- 5 5. The shaped article of claim 4 wherein the film is an aromatic-aliphatic copolyester.

- 10 6. A two-stage process for producing finished filled thermoplastic biopolymer in which the inert filler is uniformly distributed, in a first stage, comprising,
 - (i) adding from 20 wt% to 100 wt% of essentially anhydrous inert filler particles, and
 - 15 all the VCI ingredients to be present in the finished film, to essentially anhydrous biopolymer;
 - (ii) blending the mixture at a temperature below the melting point of the biopolymer, to make a biopolymer concentrate in which the concentration of dispersed particles is in the range from about 25 - 60 phr for 50 phr of biopolymer;
 - 15 (iii) further dispersing the inert particles and VCI ingredients while melting the polymer to form a molten concentrate, preferably in the barrel of an extruder;
 - (iv) cooling the molten concentrate into a solidified mass of arbitrary shape; and,
 - (v) comminuting the solidified mass to form granules smaller than about 12.5 mm; and in a second stage comprising,
 - 20 (vi) drying the granules to an essentially anhydrous condition;
 - (vii) blending dried granules with at least twice as much fresh essentially anhydrous biopolymer so as to provide the desired amount of more than 5 wt%, but less than 35 wt% filler and less than 3 wt% of VCI ingredients in a finished blend; and,
 - (viii) thermoforming the finished blend into a desired shape having a tensile strength no
 - 25 lower than 2000 psi in at least one direction.

- 30 7. The process of claim 6 wherein step (viii) comprises blowing film having a thickness in the range from about 0.025 mm to 0.25 mm, and the film is substantially transparent.

8. The process of claim 6 wherein step (viii) comprises injection molding a shaped

article.

9. The process of claim 7 wherein in step (ii) blending the mixture to make a biopolymer concentrate in which the concentration of dispersed particles is 50 phr for
- 5 50 phr of biopolymer.